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13. ABSTRACT /This procedure describes test methodology and techniques for use in conducting maintenance evaluations for general supplies and equipment./ Information is provided to assist in obtaining data which will contribute to the determination of item availability (system readiness), thereby providing adequate confidence that the test item and its maintenance test package are suitable for service testing.		

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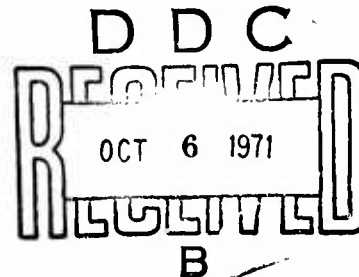
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Materiel Test Procedure 10-2-507
General Equipment Test Activity

U. S. ARMY TEST AND EVALUATION COMMAND
COMMON ENGINEERING TEST PROCEDURE

MAINTENANCE EVALUATION



1. OBJECTIVE

This document provides test methodology and techniques for use in conducting maintenance evaluations for commodity items within the general supplies and equipment category. This evaluation is conducted for the purpose of verifying that test item maintenance/maintainability characteristics satisfy those requirements established by applicable Materiel Need (MN) and other established criteria. Further, information as provided herein is intended to assist in obtaining data which will contribute to the determination of test item availability (system readiness), thereby providing adequate confidence that the test item and its maintenance test package are suitable for service testing.

2. BACKGROUND

The highly technical nature of modern Army materiel and the service required of it, makes it essential that the commodity item possess characteristics such that an acceptable confidence level can be established concerning item/system availability.

Achieving required test item availability necessitates accomplishment of an adequate maintenance evaluation during commodity engineering and other appropriate testing operations.

Engineering test maintenance evaluations are primarily concerned with the items maintenance and maintainability parameters; although, by their very nature they also address some phases of reliability.

The Army, in setting up its program, has grouped all maintenance into four categories: organizational, direct support, general support, and depot. These levels of maintenance, and desired commodity item/system maintenance/maintainability characteristics are discussed in AMCP 706-134, USATECOM Regulation 750-15, and other documents as referenced by this procedure.

3. REQUIRED EQUIPMENT

This document should be used in conjunction with overall testing and evaluation as covered by specific commodity engineering test procedures. For information and guidance in the necessity for and selection of "Test, Measurement, and Diagnostic Equipment" (TMDE) test personnel should review those documents pertinent to the item under evaluation including the specific Commodity Materiel Test Procedure and other documents as appropriate.

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4. REFERENCES

- A. Army Regulation 70-10, Research and Development: Test and Evaluation During Research and Development of Materiel.
- B. Army Regulation 70-38, Research and Development: Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions.
- C. Army Regulation 385-10, Safety: Army Safety Program.
- D. Army Regulation 705-5, Research and Development: Army Research and Development.
- E. Army Regulation 705-50, Research and Development of Materiel: Army Materiel Reliability and Maintainability.
- F. Army Regulation 750-1, Maintenance of Supplies and Equipment: Maintenance Concepts.
- G. Army Regulation 750-2, Maintenance of Supplies and Equipment: National Maintenance Points.
- H. Army Regulation 750-6, Maintenance of Supplies and Equipment: Maintenance Support Planning.
- I. AMC Regulation No. 70-7, Research and Development: Test and Evaluation of Materiel.
- J. AMC Regulation 750-15, Maintenance of Supplies and Equipment: Maintenance Support Planning.
- K. AMCP 11-3, Value Engineering Program Management Guidelines.
- L. AMCP 702-3, Quality Assurance Reliability Handbook.
- M. AMCP 706-134, Engineering Design Handbook: Maintainability Guide for Design.
- N. USATECOM Regulation 70-23, Research and Development: Equipment Performance Reports (EPRs).
- O. USATECOM Regulation 385-6, Safety: Verification of Safety of Materiel During Testing.
- P. USATECOM Regulation 700-1, Quality Assurance: Value Engineering.
- Q. USATECOM Regulation 750-15, Maintenance of Supplies and Equipment: Maintenance Evaluation During Testing.
- R. MIL-STD-120, Gage Inspection.
- S. MIL-STD-210, Climatic Extremes for Military Equipment.
- T. MIL-STD-470, Maintainability Program Requirements (for Systems and Equipments).
- U. MIL-STD-471, Maintainability Demonstration.
- V. MIL-STD-721, Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety.
- W. MIL-STD-810, Environmental Test Methods.
- X. MIL-STD-1472, Human Engineering Design Criteria for Military Systems, Equipment, and Facilities.
- Y. Military Specification MIL-C-45662, Calibration System Requirements - Calibration Standards.
- Z. Military Specification MIL-E-4970, General Specifications for Environmental Testing, Ground Support Equipment.

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- AA. MTP 2-2-500, Vehicle Characteristics.
- AB. MTP 2-2-502, Inspection (Automotive).
- AC. MTP 2-2-503, Maintenance (Vehicles).
- AD. MTP 2-2-506, Durability Testing of Wheeled Vehicles.
- AE. MTP 2-2-507, Durability Testing of Tracked Vehicles.
- AF. MTP 2-2-508, Safety Evaluation (Automotive).
- AG. MTP 2-2-803, Human Factors Engineering (Vehicles).
- AH. MTP 3-1-002, Confidence Intervals and Sample Size.
- AI. MTP 10-2-211, Packaging and Containers.
- AJ. MTP 10-2-500, Physical Characteristics.
- AK. MTP 10-2-501, Operator Training and Familiarization.
- AL. MTP 10-2-502, Durability.
- AM. MTP 10-2-505, Human Factors Evaluation.
- AN. MTP 10-2-508, Safety.
- AO. MTP 10-2-511, Quality Assurance.
- AP. MTP 10-4-001, Desert Environmental Test of General Supplies and Equipment.
- AQ. MTP 10-4-002, Arctic Environmental Test of General Supplies and Equipment.
- AR. MTP 10-4-003, Tropic Environmental Test of General Supplies and Equipment.
- AS. Specific Commodity Materiel Test Procedure as appropriate for the item under evaluation.
- AT. DA Pamphlet 705-1, Maintainability Engineering.
- AU. MIL-HDBK 472, Maintainability Prediction.

5. SCOPE

5.1 SUMMARY

This document provides general information and guidance for use in accomplishing the maintenance evaluation for commodity items within the general supplies and equipment category. Basic considerations are as follows:

a. Preparation for Test - A pretest inspection and review; including receipt inspection and inventory check, a determination of the test item physical characteristics, a training and familiarization program, and guidance in the preparation of necessary checklists, questionnaires, and the maintenance log.

b. Test Conduct - A series of evaluations conducted for the purpose of determining test item maintenance/maintainability characteristics. Consideration is given to:

- 1) Design for Maintainability - A review conducted from an engineering viewpoint for the purpose of ensuring that design characteristics reflect proper maintenance/maintainability considerations.
- 2) Equipment Publications - A general review of all applicable technical manuals and publications conducted for the purpose of determining adequacy and accuracy.

- 3) Tools and Equipment - An evaluation of all special tools, test equipment, and other material as furnished in the maintenance test package, conducted for the purpose of ensuring that these items are adequate, necessary, and that they do the task for which they are intended.
- 4) Repair Parts - An evaluation and inspection of all repair parts; considering interchangeability, compatibility, and overall ease of installation and alignment.
- 5) Storage Facilities and Components - An inspection of all storage facilities as incorporated into the test item. Consideration is given to adequacy, compatibility, suitability of location, and to protection of the stored item from environmental effects.
- 6) Safety Aspects of Maintenance Operations - An evaluation to determine the safety characteristics and possible hazards of the test item and its maintenance test package.
- 7) Human Factors Aspects of Maintenance Operations - An evaluation of the test item to ensure proper man-item interaction, accessibility, and overall ease of maintenance, service, and repair.

5.2 LIMITATIONS

This document is intended for use in evaluating several different commodity items. The great variety and complexity of this materiel makes it impracticable to provide precise information and guidance for each commodity type or category. The specific item being tested, including its complexity, will, to a large degree, determine the type and extent of testing and evaluation required. For these reasons material as presented herein is general in nature; test personnel should review all appropriate documents and requirements to such depth and detail as is necessary to assure an effective and complete evaluation.

6. PROCEDURES

6.1 PREPARATION FOR TEST

Upon receipt of the test item the following shall be accomplished.

6.1.1 Receipt Inspection and Inventory Check

a. Conduct an inventory against the Basic Issue Item List (BIIL) and visually inspect the shipment; record the total number of items received and the following:

NOTE: Missing, inappropriate, or incomplete maintenance test packages and/or other noted shortages or discrepancies will be reported on EPRs in accordance with USATECOM Regulation 70-23 immediately upon receipt of the test item.

- 1) Noun nomenclature.
- 2) Model number.
- 3) Serial number.
- 4) Manufacturer.
- 5) Maintenance test package data:
 - a) Maintenance literature.
 - b) Repair parts.
 - c) Common and special tools.
 - d) Test measurement and diagnostic equipment.
 - e) Handling equipment.
 - f) Other.
- 6) Accessories, kits, and other items furnished.
- 7) All instructional material, literature, and draft technical manuals.
- 8) Any indication of improper preservation and/or packaging (refer to MIL-STD-101 and other applicable documents).
- 9) Any indication of damage incurred during shipment.
- 10) Noted deficiencies and potential safety hazards.

b. Carefully examine the test item and record any evidence of defects in the areas of workmanship, materials, and construction with emphasis on any findings which could influence the item maintenance/maintainability characteristics.

c. Photograph the shipment; particular attention should be given to any damaged areas and potential safety hazards.

6.1.2 Physical Characteristics

Accomplish the applicable procedures of MTP 10-2-500.

6.1.3 Training and Familiarization

a. Ensure that all test and maintenance personnel are thoroughly familiar with all local test activity safety precautions and procedures and those standing operating procedures (SOP's) appropriate for the commodity item under evaluation.

b. Ensure that all test and maintenance personnel are oriented in accordance with MTP 10-2-501.

c. Test and maintenance personnel shall review those applicable documents as referenced by this procedure, all equipment publications, draft technical manuals, and all other material as appropriate for the commodity under consideration. Ensure that personnel are familiar with the following as appropriate.

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- 1) The maintenance characteristics and requirements of the test item.
- 2) All appropriate definitions and terminology as related to testing, maintenance, and the test item. (Consult MIL-STD-721, USATECOM Regulation 750-15, and other applicable documents.
- 3) The categories of maintenance required for the commodity under consideration and the evaluations to be accomplished.
- 4) Appropriate personnel should be familiar with the accept/reject criteria of MIL-STD-471.
- 5) All appropriate information concerning the environments within which the test item must function.
- 6) Other appropriate information and requirements as may be established by the MN.

d. Record all appropriate information as required by MTP 10-2-501 and the following information: for each team member associated with the commodity evaluation.

- 1) Rate/rank.
- 2) MOS.
- 3) Past experience.
- 4) Duties assigned.
- 5) Extent of additional training required.

6.1.4 Checklists, Questionnaires and Log

In preparation for the maintenance evaluation, personnel should review the applicable MN, the specific commodity item Materiel Test Procedure (MTP), the test conduct section of this MTP, all applicable documents as referenced herein, appropriate draft technical manual(s) and all other pertinent instructional and maintenance related material as furnished with the test item. The purpose of this review is to determine in advance of testing, all maintenance information germane to the item under consideration and to enable the evaluation team to prepare the necessary checklist and other necessary material prior to starting the evaluation. Proceed as follows:

a. Prepare questionnaires and/or checklists as appropriate for the commodity item under evaluation. These lists should be included in the test plan and should include all points to be considered during the evaluation.

- NOTES:
1. Typical questions and checklists are presented in AMC Pamphlet AMCP 706-134. Additional general considerations are indicated in section 6.2 of this document.
 2. Much information will be recorded in the maintenance log. This information when covered by checkoff lists should be brief in nature and, as the name implies, used for checkoff purposes only.

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b. Prepare a maintenance log. The log should be prepared to suit the commodity item under consideration and shall be maintained throughout the evaluation. The log should indicate all maintenance and service performed; consider the following:

- 1) Maintenance category prescribed by the maintenance allocation chart (MAC) and those recommended for and utilized during accomplishment of the engineering test. In indicating levels, the following codes shall be used:
 - a) C - Operator/Crew.
 - b) O - Organizational.
 - c) F - Direct Support.
 - d) H - General Support.
- 2) Each scheduled maintenance action for each maintenance category. Indicate the following:
 - a) What maintenance tasks were performed.
 - b) Total manhours expended.
 - c) Number of mechanics used.
 - d) Total downtime in clock hours.
- 3) Each unscheduled maintenance action for each maintenance category. Indicate appropriate data as noted (above) for scheduled maintenance.
- 4) Each malfunction; describe the malfunction and indicate whether it is (refer to USATECOM Regulation 750-15):
 - a) A chargeable system failure or
 - b) A non-chargeable system failure.
- 5) At the time of each malfunction the following shall be indicated.
 - a) Failed component (identify).
 - b) Accumulated operating time for the test item/system.
 - c) Accumulated operating time for the failed component.
 - d) Other parameters where appropriate, (i.e., cycles, events, etc.).
- 6) For each malfunction, personnel should determine and record the following:
 - a) Seriousness of the failure; indicate the effect of the failure with regard to overall test item effectiveness, reliability, availability, and/or other appropriate consideration.

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- b) Reason for the failure.
 - c) Manner in which the malfunction was detected and the methods used to locate the failing component.
 - d) Corrective action taken and tools and repair parts used. For repair parts, identify by noun nomenclature federal stock number (FSN), functional group number, part number, or as a last resort, the manufacturers part number.
 - e) The time in manhours and clock hours (downtime) to correct chargeable system failures.
- 7) Based on the accumulation of the above data, for all test samples involved, the following computations will be made as appropriate.

NOTE: For definitions and guidance see
MIL-STD-721, USATECOM Regulation
750-15, MIL-HDBK-472, MIL-STD-471,
and DA Pamphlet 705-1.

- a) Mean Time to Repair (MTTR). (Compute for each category of maintenance including overall MTTR.)
- b) Mean Time Between Failures (MTBF). (For computing Inherent Availability.)
- c) Maintenance Ratio (MR). (Compute for each category of maintenance including overall MR.)
- d) Mean Down Time (MDT).
- e) Mean Active Maintenance Downtime (\bar{M})
- f) Mean Time Between Maintenance (MTBM).
- g) Inherent Availability (A_i).

$$A_i = \frac{MTBF}{MTBF + MTTR}$$

where

MTBF = Mean-time-between-failure;

MTTR = Mean-time-to-repair failures

- h) Achieved Availability (A_a).

$$A_a = \frac{MTBM}{MTBM + \bar{M}}$$

where

MTBM = Mean-time-between-maintenance;

\bar{M} = Mean active maintenance downtime resulting from both preventive and corrective maintenance actions.

- 1) Operational Availability (A_o). (Compute only when required by the MN.)

$$A_o = \frac{MTBM}{MTBM + MDT}$$

where

MTBM = Mean-time-between maintenance, and

MDT = Mean downtime, including supply downtime and administrative downtime during the same time interval.

- j) Maintainability (M). (See Military Standardization Handbook (MIL-HDBK-472), MIL-STD-471, and DA Pamphlet 705-1.)
- 8) Any recommendations for preventative maintenance or other measures intended to improve the product and its maintenance characteristics.
- 9) Other information and data as appropriate.

6.2 TEST CONDUCT

The maintenance evaluation should be a complete and thorough review of the commodity item maintenance/maintainability characteristics, conducted from an engineering viewpoint with emphasis on design for maintainability, ease of maintenance and inspection, installation of parts and components with minimum time and effort, simplicity in handling and maintaining the test item with minimum number of special tools, evaluation of human factors implications and safety aspects of maintenance operations.

Normally, the evaluation should start concurrently with and continue throughout accomplishment of all engineering tests. Testing and evaluation will be done simultaneously to the maximum extent possible. Where required, separate maintenance functions and evaluations will be performed as necessary to ensure adequate confidence levels.

- NOTES:
1. All equipment malfunctions and other maintenance problems occurring during accomplishment of testing shall be recorded as appropriate for the maintenance evaluation and shall be reported in accordance with USATECOM Regulation 70-23.
 2. Caution must be exercised not to use data for maintainability purposes when such data reflects stresses which were obtained by testing beyond the required design characteristics of the item.
 3. It is imperative that all maintenance

- data, such as man-hours expended, maintenance downtime, parts consumed, failure data, etc., be properly recorded.
4. All authorized organizational maintenance functions listed on the maintenance allocation chart will be performed on the test item and its ancillary equipment during service testing. Evaluations as accomplished in accordance with this document should be limited to those maintenance tasks necessary to support or maintain the item during test and will not include items defined in 5., below. Direct and general support maintenance will be performed only to maintain the test item. All preventive (scheduled) maintenance services prescribed by the manuals will be performed and evaluated.
 5. Commodity items and kits which are intended primarily for use in extreme natural environments will be given a complete and thorough maintenance evaluation at all maintenance levels under normal maintenance conditions appropriate to the particular environment.

6.2.1 Design for Maintainability Review

Determine whether the item meets the maintainability design requirements as specified by the MN or other established criteria.

NOTE: This review should be based on evaluation and observations made during preoperational and post operational inspections, during test item operation, service and maintenance and throughout conduct of all testing.

a. In accomplishing the design for maintainability evaluation, personnel should use checklists as prepared in accordance with section 6.1.4 of this document. A complete and concise listing of design for maintainability considerations is given by AMC Pamphlet AMCP 706-134. Since considerations as indicated by this pamphlet are extensive in nature, they will not be covered herein; general considerations are indicated below.

- 1) Design should minimize maintenance requirements through proper selection of materials, components, etc., and attainment of optimum test item durability.

- 2) Consider prior experience and maintenance problems which were previously encountered in similar items of materiel.
- 3) The test item should be designed for ease of maintenance by assuring accessibility to facilitate inspection, repair, and replacement.
- 4) Design should allow for maximum utilization of interchangeable components.
- 5) Design should allow for maximum compatibility of maintenance operations with common tools.
- 6) The test item should be designed to allow for ease of packaging.
- 7) Design should allow for removal of major components as individual units.
- 8) All unduly difficult or time-consuming operations, or design deficiencies prejudicial to ease of maintenance, will be noted. Consider any condition which will adversely affect the conduct of maintenance operations or generate excessive maintenance and supply requirements.

6.2.2 Equipment Publications Evaluation

Equipment publications and draft technical manuals will be used for performing maintenance operations during engineering tests. They will be reviewed for technical adequacy and accuracy. Consider the following:

a. Equipment publications and maintenance material shall be:

- 1) Complete.
- 2) Accurate.
- 3) Clear.
- 4) Simple.
- 5) Consistent within themselves.
- 6) Adequate to support the test item.

6.2.3 Tools and Test Equipment Evaluation

It is essential that engineering test personnel use the tools, test equipment or other items furnished in the maintenance test package so that realistic maintenance data may be developed with respect to evaluating maintenance test package elements and the quantification of data for correlation with other appropriate tests. Consider the following and record all appropriate data, information, and/or comments.

a. Does the tool (or item of equipment) accomplish the task for which it is intended?

b. Adequacy and simplicity of tools and test equipment used.

c. Adequacy of instructions contained in manuals for use of tools and test equipment.

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d. Whether tools and test equipment are excessive based on experience with similar items.

e. Whether special tools could be replaced with common tools.

f. Other as applicable.

6.2.4 Repair Parts Evaluation

Throughout the evaluation and conduct of the engineering test, the following observations and considerations will be made and the necessary data recorded.

a. Each repair part used shall be compared with the removed part to ensure interchangeability.

b. Ensure that repair parts are compatible with the test item and that design allows for easy installation and alignment.

6.2.5 Storage Facilities and Components Evaluation

Personnel shall inspect the test item to determine that adequate storage facilities and components are provided as appropriate. Consider the following:

a. Storage facilities should be compatible with the test item and the component to be stowed. Ensure proper size, strength, durability, and suitability of location.

b. Storage facilities should provide adequate protection against weather, grease, oil, dirt, and physical damage.

6.2.6 Safety Aspects of Maintenance Operations

Testing and maintenance personnel will monitor safety aspects of the maintenance functions throughout the conduct of the test. The following shall be accomplished:

a. Ensure that the test item has been evaluated in accordance with MTP 10-2-508 and in particular that the following has been accomplished.

- 1) Inspect the test item and determine that it is provided with all necessary protective devices, and interlocks.
- 2) Inspect warning plates and instruction plates to determine if the warnings and instructions are adequate and that the plates are positioned at conspicuous locations. Record inadequate warnings and instructions, and recommend repositioning of plates.
- 3) Inspect the test item to determine if suitable guards

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and covers are provided for dangerously exposed moving parts, electrical circuits, and parts operating at hazardously high or low temperatures. Determine if adequate barriers, shields, masks, glasses, or other protective gear are installed or separately provided to protect the hearing, sight, temperatures, respiratory system, and skin from noise, light, gas and chemical damage. Record findings and additional needs.

- NOTES: 1. For additional safety considerations consult AMC Pamphlet AMCP 706-134.
2. Prepare a checklist or questionnaire for accomplishment of this evaluation.

6.2.7 Human Factors Aspects of Maintenance Operations

The effectiveness of the man-item relationship shall be determined. Accomplish the following:

a. Ensure that all applicable procedures of MTP 10-2-505 have been accomplished.

b. Upon completion of each type of maintenance operation, maintenance and human factors personnel shall comment on the following:

- 1) Adequacy of hoisting, lifting, and towing facilities.
- 2) Ease of operations.
- 3) Physical effort required for performance of duties.
- 4) Adequacy of working space.
- 5) Simplicity in servicing and performing maintenance duties.
- 6) Effects of engine fumes on mechanics.
- 7) Accessibility to components.
- 8) Freedom of the mechanic to reach and work adequately as influenced by the configuration or placement of components, or by his clothing or size.
- 9) Servicing factors such as lubrication of equipment, replenishing tanks and reservoirs, and similar considerations.
- 10) Any considerations which would improve test item maintenance/maintainability characteristics.

NOTE: For additional human factors considerations consult AMC Pamphlet AMCP 706-134.

6.3 TEST DATA

NOTE: Data resulting from this evaluation should consist of completed checklists, questionnaires, the maintenance log, narrative descriptions, photographs, charts, sketches, and other information as appropriate for the commodity item under consideration and the evaluations accomplished.

6.3.1 Preparation for Test

6.3.1.1 Receipt Inspection and Inventory Check

Record the following:

- a. Test item nomenclature.
- b. Model number.
- c. Serial number
- d. Manufacturer.
- e. Maintenance test package data.
- f. Accessories, kits, or other items as furnished with the
test item.
- g. All instructional material, literature, and draft technical
manuals.
- h. Any indication of improper presentation and/or packaging.
- i. All noted deficiencies and any condition which is considered
hazardous.
- j. Any indication of damage incurred during shipment.
- k. Any materials missing from the Basic Issue Items List (BIIL).

6.3.1.2 Physical Characteristics

Record appropriate data as required by MTP 10-2-500 and where applicable by MTP 2-2-500.

6.3.1.3 Training and Familiarization

Record the data required by MTP 10-2-501 and the following:

- a. Methods used and completion of personnel training.
- b. Evidence that personnel are sufficiently knowledgeable in objectives and procedures.
- c. The personal data required for personnel assigned to the evaluation.

6.3.1.4 Checklists, Questionnaires, and Log

Prepare checklists, questionnaires and a maintenance log as appropriate for evaluation of the particular commodity item under consideration.

6.3.2 Test Conduct

NOTE: Ensure that all checklists and questionnaires are properly completed and that the maintenance log is adequately maintained.

6.3.2.1 Design for Maintainability

Complete appropriate checklists as prepared in accordance with sections 6.1.4 and 6.3.1.4 of this document.

6.3.2.2 Equipment Publications

Record overall adequacy and accuracy of technical publications, manuals, and other literature.

6.3.2.3 Tools and Test Equipment

Record the following:

- a. Indicate the following for each tool and item of equipment:

- 1) Does the item accomplish the task for which it is intended?
- 2) Can the item be replaced with an item already in the Army system and which will normally be available as TOE material?
- 3) Is the item considered excessive based on experience with items?

- b. Overall adequacy and simplicity of furnished tools and equipment.

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c. Overall adequacy of instructions contained in manuals for use of tools and test equipment.

d. Other as appropriate.

6.3.2.4 Repair Parts

Ensure that the maintenance log reflects adequately all repair parts used and record the following:

a. Are adequate repair parts furnished with the test item?

b. Are repair parts, as furnished with the test item, considered unnecessary or excessive based on prior experience with similar items?

c. Indicate the following for each repair part.

- 1) Whether the part is interchangeable with the part to be replaced.
- 2) Whether the part is compatible with the test item.
- 3) Whether the test item is designed properly to allow for ease of installation and alignment.

6.3.2.5 Storage Facilities and Components

Record the following:

a. Whether storage facilities are:

- 1) Compatible with the test item.
- 2) Compatible with the item to be stored.
- 3) Of the proper size.
- 4) Of adequate strength and durability.
- 5) Suitably located.
- 6) Provide adequate protection against;
 - a) Weather.
 - b) Grease.
 - c) Oil.
 - d) Dirt.
 - e) Physical damage.
 - f) Other.

7) Other comments as appropriate.

6.3.2.6 Safety Aspects

Record appropriate data as required by MTP 10-2-508 and ensure that all applicable checklists and/or questionnaires have been properly completed.

6.3.2.7 Human Factors

Record appropriate data as required by MTP 10-2-505 and all comments concerning the following:

- a. Adequacy of hoisting, lifting, and towing facilities.
- b. Ease of operations.
- c. Physical effort required for performance of duties.
- d. Adequacy of working space.
- e. Simplicity in servicing and performing maintenance duties.
- f. Effects of engine fumes on mechanics (where applicable).
- g. Accessibility to components.
- h. Freedom of the mechanic to reach and work adequately as influenced by the configuration or placement of components or by his clothing or size.
- i. Servicing factors such as lubrication of equipment, replenishing tanks and reservoirs, and similar considerations.
- j. Any considerations which would improve test item maintenance/maintainability characteristics.

6.4 DATA REDUCTION AND PRESENTATION

Results of all inspections, tests, and evaluations performed in compliance with this document should be recorded in adequate detail to allow for determination of item/system maintenance/maintainability confidence levels.

All checklists and/or questionnaires shall be properly completed and the maintenance log shall be adequately maintained throughout the evaluation. All data shall be summarized and supplemented as appropriate making liberal use of photographs, sketches, and narrative descriptions. All photographs and other data will be properly identified and labeled. Data shall be obtained for each evaluation accomplished and for each item evaluated.

Data obtained shall be compared with appropriate requirements as specified in the applicable MN or other pertinent regulatory documents. Data and information obtained from different items undergoing the same evaluation(s) will be compared. Where evaluations are repeated following test item repair and continued usage ensure that proper data have been recorded in the maintenance log and that all accumulated data are in usable

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form. Data obtained following repair will be summarized and compared with previously obtained data. Where definite differences occur, the conditions that caused the differences and the degree of difference will be noted along with appropriate comments of the personnel involved. All comments and collected data should be subjective in nature and where possible should be expressed in quantitative terms. Qualitative conclusions and comments are often subject to misinterpretation and erroneous conclusions. Qualitative conclusions should be made only after careful appraisal of all pertinent data and information.

The presentation shall conclude with a summarization of overall item/system maintenance/maintainability evaluation results and any information which could contribute to the determination of item/system confidence levels.